PHOTOSYNTHESIS ACTIVE RADIATION BLOCKING SOLAR POOL COVER AND METHOD OF MAKING THE POOL COVER

Background of the Invention

Field of the Invention

[0001] This invention relates generally to solar cover for covering a swimming pool and more particularly to a floating solar cover for a pool which blocks radiation necessary for algae growth. The invention further relates to a method for making a floating solar cover for a pool which blocks radiation necessary for algae growth.

Description of the Background

[0002] Swimming pools are enjoyed in many homes as a source of recreation and as a form of exercise. However, unless a pool heater is provided or a structure built around the pool, it is difficult to utilize the pool in seasons other than summer. In order to extend the usable time of the pool, swimming pool covers have been developed to prevent the loss of heat when not in use. In particular, one type of pool cover involves a plastic device with air pockets which cause the cover to float on the surface. The air pockets then act as insulation and prevent evaporation of the pool water as well as convection losses.

[0003] Such a pool cover is seen in US Patent 6,523,190. As taught there, two films may be sealed in order to form air pockets which cause the cover to float. In addition, the film may also contain various infrared absorbing materials within the plastic in order to absorb infrared radiation which causes the plastic, air pockets and pool to be heated. Thus, this pool cover not only prevents losses but also helps to heat the pool when the pool is not being used.

[0004] While these covers are very effective for preventing heat loss and even helping to warm the pool and thus providing added enjoyment for the user in an extended period of use during the year, it is not helpful for other facets of pool maintenance. One of the concerns to a swimming pool owner is the growth of

algae within the pool water. Algae grows more quickly in warm water and accordingly the use of a pool cover to help keep the water warm actually encourages algae growth. Accordingly, it would be desirable to use a pool cover which also helps prevent algae growth.

[0005] Previously, in the area of agriculture, wavelength blocking to prevent weed development has been utilized. In particular, a black plastic film has been utilized to block all radiation in agriculture and by gardeners for many years so as to block any radiation to plant life below, except where the plants extend through cuts in the film. This black plastic thus blocks all radiation. Clear plastic has also been utilized which allows the transmittance of solar heating to warm the ground below and increase a crop yield by extending the growing season. Other films which are wavelength selective are also available in brown and blue-green colors, which block various wavelengths of light in order to suppress the growth of weeds. (See *Solar Infrared Transmitting, PAR Absorbing Polyethylene Mulch: Physical Properties and Crop Responses*, J. Brent Loy, *Proc. Natl. Agr. Plastics*, 1991). However, this has not been applied to algae suppression.

Summary of the Invention

[0006] The present invention provides a swimming pool cover which helps prevent algae growth.

[0007] The present invention further provides a cover for a body of water which reduces photosynthesis active radiation.

[0008] The present invention further provides a heat-retaining swimming pool cover which filters out photosynthesis active radiation to reduce algae growth.

[0009] The present invention still further provides a floatable heat-retaining swimming pool cover which includes radiation absorbent materials to retard algae growth.

[0010] The present invention still further provides a method for making a cover for retarding algae growth.

[0011] These objects are achieved by providing a pool cover using two plastic films which are sealed together to form air pockets so that the cover floats and which also contains a radiation absorbent material within the plastic which removes the wavelengths of radiation necessary for algae growth.

[0012] Additionally, these objects are achieved by a method for making an algae retardant pool cover, including providing material for absorbing light in selected wavelengths necessary for algae growth, mixing this material into a plastic material, forming a plastic film including the plastic material and the material for absorbing light and forming a pool cover from the plastic film.

[0013] Additionally, these objects are achieved by a method of making an algae retardant pool including forming a plastic film and applying a layer of material for absorbing light in selected wavelengths necessary for algae growth on to a surface of the plastic film.

[0014] Further scope of the applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

Brief Description of the Drawings

[0015] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

[0016] Fig. 1 is a cross sectional view of a floatable swimming pool cover containing air pockets;

[0017] Fig. 2 is a flow chart of a first embodiment of a method of making a pool cover;

[0018] Fig. 3 is a flow chart of a second embodiment of a method of making a pool cover;

[0019] Fig. 4 is a cross-sectional view of a second embodiment of a swimming pool cover.

Description of the Preferred Embodiments

[0020] Referring now to Fig. 1, a pool cover 1 is seen in cross section. The pool cover is shown as floating on the water 2 within a swimming pool 3 or other small body of water. Although the present application is directed to a swimming pool cover, it could also be used for other pools such as fishponds, or decorative pools.

[0021] The pool cover includes a plastic upper film 5 and a plastic lower film 8. The two films are joined together to form air pockets 10 which contain air therein so that the cover will float on the water. Sealed land areas 11 are formed between the air pockets where the films maybe sealed to each other.

[0022] The films are generally made of essentially transparent plastic films such as vinyl or olefin, e.g., polyethylene and polypropylene, or acetate films. Films may contain a small amount of tint for cosmetic purposes, such as a light blue tint. The film may also include infrared absorbent material 15 in order to provide heat to the water. Light absorbing material 6 is included in upper film 5. However, it could be included in film 8 alone, or in both.

[0023] Studies of algae have shown that the chlorophyll contained therein react to specific wavelengths of lights and these specific wavelengths are especially necessary for the algae to grow. Different species of algae require different specific wavelengths. Providing the wavelengths necessary for one species will stop that species from growing, but not other species. The specific wavelengths defined for chlorophyll "A" and "B" (primary mechanisms for plant life) are centered on peaks at 410nm, 430nm, 453nm, 642nm and 662nm. Although there is a small spread around each of these peak points, most of the necessary light for growth falls in the

region of 350-500nm and 600-700nm. Thus, by removing these wavelengths of light, algae will not grow to any appreciable extent.

[0024] There are at least two ways to prevent these wavelengths of light from passing through the pool cover. One method would be to include a material that because of its color, absorbs the light in this range. Since the mid 600nms are typically orange and the low 400nms are typically violet, some type of dye or other colorant that contain these colors may be able to absorb these wavelengths and thus block their passage into the water. Thus, the pool cover can be made of plastic having an orange color or a color close to orange, such as red. It also could include an aqua (blue-green) color or a violet color.

[0025] Another method would be to add certain chemicals which absorb these specific wavelengths but are not colored themselves. Materials which absorb these wavelengths to some extent include sulfates, carbonates, silicates, and silica. Specific compounds that may be used include, but are not limited to, barium sulfate, titanium dioxide, magnesium silicate, sodium sulfate, synthetic amorphous silica, calcite, silicon dioxide, carbon black, and magnesium hydroxide. By utilizing various of these components or combinations thereof, the particular wavelengths which generate algae growth can be removed as light passes through the pool cover and so block the necessary component of growth for the algae. The particular mixture of materials may be chosen as desired in order to attain the best results in wavelength blockage and may also be chosen due to cost. In addition, it is also possible to mix some of the colorant material with the non-colored materials from either for efficiency or cost.

[0026] The first method for making the pool cover is shown in Fig. 2. The material which is added would normally be mixed into a small amount of resin carrier (step 101) which is then added to the plastic film (step 102) as it is being generated and before the pool cover is manufactured (step 103). Thus, the absorbent material is produced within the films which is simple and economically feasible. Either the upper film 5 or lower film 8 or both films 5 and 8 can be treated.

[0027] It would also be possible to add these materials as a separate layer as shown in Fig. 2, but this would require additional steps and accordingly would be more expensive. This separate layer could be an additional film between upper film 5 and lower film 8 or could be on one or both sides of either film 5 or 8. As another alternative, the extra film could be on both exterior sides of film 5 and 8. Many different combinations should be apparent to those skilled in the art. Step 201 shows the formation of plastic films. Step 202 shows the addition of the layer of light-absorbing material 211 or both of the films. Step 203 shows the manufacturing of the pool cover from the films.

[0028] This invention has been discussed as being used in a floatable pool cover with air pockets. However, this invention can also be used with a non-floatable pool cover that is simply suspended above a pool or in a pool cover having other means for floating on this surface of the pool as shown in Fig. 4. The pool cover 1 is shown floating on the surface of water 2 within a swimming pool 3, just as in Fig. 1. The cover includes a single film 21 which is floated on the surface by floats 22. The floats may be replaced by ropes or other means of suspension, if desired. The floats or ropes may be attached to the film or the film may merely be laying loose on the top of the supports.

[0029] Numerous additional modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.